

Date: _____

Name: _____

Blk: _____

Chemistry 11 Periodic Table Lab

Introduction:

The periodic table used today is a product of the 1st periodic table published by Russian chemist Dmitri Mendeleev in 1869 (150 years ago!). The amazing accuracy of his predictions for as-yet unknown elements, using trends within groups and periods, has been very significant to chemists. The bases of his periodic table were the physical properties, the chemical properties, and the atomic masses of the elements rather than atomic numbers. Henry Moseley rearranged the Mendeleev Periodic Table based on atomic numbers of elements. In accordance with this modification, the **periodic law** states that the properties of the elements are **periodic functions of their atomic number**.

Each known element possesses a complete set of properties that fully characterizes it and distinguishes it from all other elements. The arrangement of the elements into groups or families (vertically) and into periods (horizontally) reflects the periodic or repeating nature of many of the properties of the elements.

Objectives:

1. You will use coded symbols for the main group elements in the **first 4 periods** of the periodic table to generate a modified periodic table
2. You will use your knowledge of trends and characteristics of elements to predict the location of these coded elements

Procedure:

Place the following unknown main group elements on the blank periodic table provided using the following clues. The unknown elements belong together in these groups but not necessarily in this order:

YQC ORHE IWAD KGS PJZ VNU FTM XLB

T has a total of 6 electrons in its neutral atom

H₂Z is the simple formula of an oxide

O is less dense than R

R is an alkali metal

D is a noble gas

C is a metal that melts in your hands
V is a liquid at room temperature
Y has the highest ionization energy in its group
A has 10 protons
N has a lower chemical reactivity and lower ionization energy than U
B has 5 electrons in its outer energy level
E is a colourless gas
W has an atomic number one higher than E
X is a semiconductor (metalloid)
N is a halogen
S has a higher chemical reactivity than that of G
I has an atomic number 3 times that of S
P has an atomic mass 2 times that of Z
Atoms of H are larger than those of R
L has a larger atomic radius than that of Z
The electrons of atom M are distributed over 3 major energy levels
The atomic radius of J is the largest of its group

Analysis:

As this is not a quantitative lab, there is no data to analyze.

Discussion:

1. List 3 properties that distinguish a metal from a non-metal
2. List 3 properties that distinguish a non-metal from a metal
3. List 3 properties that are unique to a semi-conductor (metalloid)
4. From this activity is "Y" a metal, non-metal or semi-conductor (metalloid)?
Support your answer
5. What is the chemical formula for the chloride of C? Support your answer.
6. Does Q conduct electricity as a solid? Support your answer.
7. Which of the activities elements is the most metallic? Support your answer.
8. Which of the elements in the group IWAD has the largest atomic radius?
Support your answer.
9. Which of the elements in the third period has the smallest atomic radius?
Support your answer.

Sources of Error:

As this is not a quantitative lab, there are no sources of error.

Conclusion:

When writing your conclusion summarize the 2 listed objectives and be sure to include a connection to your everyday life!

